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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,562	04/09/2004	Jerome J. Braun	MIN-P01-001	2610

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EXAMINER	
YU, MELANIE J	

ART UNIT	PAPER NUMBER
1641	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/822,562	BRAUN ET AL.	
	Examiner	Art Unit	
	Melanie Yu	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,10,11,14-16,19-29,36-40 and 47-66* is/are pending in the application.

4a) Of the above claim(s) *1-5,10,11,14-16 and 19-29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *36-40 and 47-66* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/5*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

5:0-0

DETAILED ACTION

1. Applicant's amendment filed 19 May 2005 has been entered. Claims 6-9, 12-13, 17-18, 30-34 and 41-46 are canceled. Claims 1-5, 10-11, 14-16 and 19-29 are withdrawn. Claims 47-66 are new. Claims 1-5, 10-11, 14-16, 19-29, 36-40 and 47-66 are currently pending in this application.

Election/Restrictions

1. Applicant's election with traverse group II, claims 36-40 and new claims 47-66, in the reply filed on 19 May 2005 is acknowledged. The traversal is on the ground(s) that groups I and II are related because the systems of group I can be used in the methods of identification of group II and because the searches are co-extensive and can be examined simultaneously without significant additional burden. This is not found persuasive because the method of groups I and II require different steps as set forth in the office action mailed 19 April 2005. Therefore, the search terms required to search the invention of group I do not encompass the search terms required to search the invention of group II.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

2. The information disclosure statement filed 5 August 2005 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. The reference of Delehanty et al. was not considered on the IDS because a copy of the reference has not been provided.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 36-40 and 47-66 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 36 is vague because it lacks correlation. The preamble of the claim recites a method for identifying the presence of a pathogenic agent. However, the body of the claim does not recite identification of a pathogenic agent. It is not clear whether employing information fusion is sufficient for identifying the presence of a pathogenic agent. The phrase "disparate types of biological data" is unclear because it is vague as to what kind of biological data is collected. It is unclear whether the types of biological data are collected, and whether the collection of any type of biological data is representative of a biological response. The claim recites the limitation "the same" in lines 2 and 3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 37 recites the limitation "the same" in line 3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 38, it is unclear whether employed microarrays comprise one set of probes or whether employed microarrays comprise one set of probes per each microarray.

Claim 39 recites the limitation "the pathogen" in lines 2-3 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 47 lacks correlation because the preamble of the claim recites collecting disparate types of data and the body of the claim does not appear to provide for collecting disparate types of data. Therefore, it is unclear whether the claim is drawn to collecting disparate types of data. Furthermore, the phrase "the method" recited at line 7 of the claim is vague because it is unclear what method further includes the recited steps. It is vague as to whether the steps of applying and detecting are intended to further limit the method of collecting disparate types of data or identifying the presence of a pathogenic agent. The claim recites "the measured" in line 8 of the claim. There is insufficient antecedent basis for this limitation in the claims.

Regarding claims 48 and 49, the claims lack correlation because the preamble of claim 47 recites collecting disparate types of data. The method steps of claims 48 and 49 do not appear to provide for collecting data. Claim 48 recites "the identification" at line 3 of the claim. There is insufficient antecedent basis for this limitation in the claim. Claims 47 and 49 recite a plurality of biological responses, which is vague because it is unclear if the plurality of biological responses recited in claim 49 are the same as those recited in claim 47. Furthermore, it is unclear whether the plurality of biological responses are in addition to the biological response of claim 36 or whether the biological response of claim 36 is included in the plurality of biological responses recited in claims 47 and 49.

Claims 50 and 51 recite the phrase "substantially all", which is vague because it is unclear what amount of measured biological response data is required to encompass substantially all of the measured data.

Claim 53 recites the phrase "high virulence is vigorous", which is vague because it is unclear what amount of virulence is encompassed by high, and what amount is required to be vigorous.

Regarding claim 58, the recited "and/or" is vague because it is unclear whether the multiple types, species of host cells, multiple microarray types, multiple disparate sets of probes, and multiple modalities are required for fusing information.

Claim 65 recites using subspace measures of fitness which is vague because it is unclear for what the subspace measures of fitness are used. It is unclear whether subspace measures of fitness are intended for use in fusing multiple classifiers.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 36-38 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Manger et al. (How the host 'sees' pathogens: global gene expression responses to infection, Current Opinion in Immunology, 2000, Vol. 12, pages 215-218).

Manger et al. teach a method for identifying the presence of a pathogenic agent, comprising: collecting disparate types of biological data representative of a biological response to the same pathogenic agent (comparing responses induced by sets of microorganisms that

differ, pg. 217, left column, second paragraph, lines 1-5), and employing information fusion to process the biological response (examined wide variety of species and applied two-way clustering across genes, collect and analyze response profiles obtained from human cells is employing fusion in order to determine biological responses, pg. 217, left column, second paragraph last 2 lines-right column, first paragraph).

Regarding claims 37 and 38, Manger et al. teach collecting multiple modalities of biological data representative of a biological response to a pathogenic agent (diagnostic signatures are collected for different genes with the same pathogen, pg. 217, left column, second paragraph). Manger et al. teach collecting data including employing microarrays having a set of probes (DNA microarrays are used to view the transcription events that underlie the host response to pathogens (pg. 215, right column, second paragraph, lines 1-3; microarrays are used to examine responses from a large number of genes, pg. 216, left column, second paragraph). Manger et al. also teach the biological response including the biological response of a host cell (response from human cells exposed to infectious agents, which are pathogens, pg. 217, left column, second paragraph, last 2 lines-right column, first paragraph, host cell, pg. 215, third paragraph, lines 6-10).

5. Claims 36, 47-51, 53-55 and 58-59 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhu et al. (US 2004/0014027).

Zhu et al. teach a method for identifying the presence of a pathogenic agent comprising: collecting disparate types of biological data representative of a biological response to the same pathogenic agent (different sets of arrays creates a control and disparate types of data are

collected from the arrays, par. 0138), and employing information fusion to process the biological response (information from test sample and control sample are fused, par. 0114).

With respect to claims 47-49, Zhu et al. teach collecting disparate types of biological data comprising: providing a set of host cells and contacting the cells with the pathogenic agent or any sample containing pathogenic agent (par. 0130, 0136), employing a microarray having a plurality of probes to measure a plurality of biological responses of the host cells (par. 0135), and wherein the method further includes, applying the measured plural biological responses to train a machine learning system to recognize the pathogenic agent (control sample results compared with test sample results, par. 0114), and detecting an identifying the pathogenic agent in a sample (par. 0138), by exposing host cells to the sample (par. 0130, 0136), using a microarray to measure plural biological responses provoked in host cells (par. 0135), and employing the trained machine learning system to identify the pathogenic agent (par. 0114). Zhu et al. further teach employing the set of host cells and a plurality of microarrays to increase a plurality of biological responses available to the identification process (four microarrays employed, par. 0135), and applying machine learning processes to the plural biological responses to identify a pathogenic signature (control signature obtained to analyze test signature, par. 0114). Zhu et al. further teach providing a plurality of sets of host cells (repeated multiple times, which means multiple sets of were used, par. 0130, 0136), contacting the host cells with a sample containing pathogenic agents to provoke and measure a plurality of biological responses (pathogens are contacted with plurality of host cells, therefore plurality of responses are generated, par. 0136), training a recognizer to detect one or more of the pathogenic signatures in a biological response provoked in a host cell (computer is trained to recognize the signature for the control sample,

par. 0114), and applying machine learning to at least one pathogenic signature (signature from control sample is compared with signature from test sample, par. 0114).

With respect to claims 50 and 51, Zhu et al. teach employing substantially all of the measured biological response data during the identification method to widen the scope of information employed during pathogen detection and including identifying a pathogen signature having substantially all of the measured biological data (par. 0135).

Regarding claim 53, Zhu et al. teach using the host cells as a natural amplification mechanism, wherein the host cell response to an agent of high virulence is vigorous, allowing improved detection and identification of pathogenic agents (par. 0038 and 00136).

With respect to claims 54 and 55, Zhu et al. teach employing a microarray wherein the modality is genomic (par. 0080). Although the claim recites employing microarrays of different modalities, the claim recites employing a single microarray and not a plurality of microarrays. Therefore, the claim is interpreted as employing a single microarray with a single modality.

Regarding claims 58 and 59, Zhu et al. teach fusing information from multiple microarray types (control and test microarrays, par. 0114) and fusing multiple candidate identification responses generated by multiple classifiers (control and test samples for mock-HCMV and HMCV, par. 0114, 0136, 0138).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manger et al., as applied to claim 36, in view of Brown et al. (Knowledge-based analysis of microarray gene expression data by using support vector machines, PNAS, 2000, pages 262-267).

Manger et al., as applied to claim 36, teach a method for identifying the presence of a pathogenic agent, but fail to teach applying machine learning.

Brown et al. teach applying machine learning to process the biological data (pg. 262, left column, 3rd paragraph) and to develop a signature for the pathogen that includes substantially all of the data collected by common probes among the microarrays (signatures for class definitions are created, pg. 263, right column, 5th paragraph), in order to functionally classify genes by using gene expression data from DNA microarrays.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the method of Manger et al., applying machine learning as taught by Brown et al., in order to provide superior gene recognition by producing less false positive and false negative results.

7. Claims 52 and 60-66 rejected under 35 U.S.C. 103(a) as being unpatentable over Zhu et al. (US 2004/0014027) in view of Braun (Sensor Data Fusion with Support Vector Machine

Techniques, 2002, Sensor Fusion: Architectures, Algorithms, and Applications VI, pages 98-109) further in view of Brown et al. (Knowledge-based analysis of microarray gene expression data by using support vector machines, 2000, PNAS, pages 262-267).

Zhu et al., as applied to claim 47, teach a method of collecting disparate types of biological data representative of a biological response, but fail to teach partitioning an input space of microarray probes.

Braun teaches using a support vector technique to partition an input space into one or more computation subspaces (pg. 101, second paragraph) and generate measures of fitness for the subspaces (computing the incompleteness for the subspaces, pg. 104, second paragraph), in order to provide data incompleteness correction, but fail to teach the input space being a microarray.

Brown et al. teach using a microarray of probes (pg. 262, right column, last paragraph) and using a support vector technique (pg. 263, left column, fourth paragraph), in order specify which data should cluster together.

Therefore it would have been obvious to include in the method of Zhu et al., a support vector technique to partition an input space and generate measures of fitness as taught by Braun, in order to provide superior gene recognition for microarrays by producing less false positive and false negative results as taught by Brown et al.

With respect to claim 52, Braun teaches allowing a recognizer to generate plural decision results (pg. 99, second paragraph), and fusing the plural decision results to generate a determination of recognition of events (pg. 99, second paragraph-third paragraph). The

recognition events are the determination of pathogens in a sample in Zhu et al. and therefore the identity of a pathogen of Zhu et al. when the method of Braun is applied.

Regarding claims 61-63, Braun teaches generating multiple measures of fitness within a subspace wherein intra-subspace measures of fitness are dynamic having a value depending on the region within the subspace and position within the subspace of a point representing the test sample (dynamic incompleteness calculations are calculated, pg. 104, second paragraph). Braun also teaches determining for a subspace a fitness measure representative of effectiveness of a classifier operating in the respective subspace (constructing a classifier, pg. 100, last paragraph) and partitioning an input into a plurality of subspaces (original space divided into higher-dimensional space, pg. 101, second paragraph).

With respect to claims 64-66, Braun teaches fusing measures of recognition generated from respective areas of the subspaces (pg. 104, fifth paragraph) and using subspace measures of fitness and fusing multiple classifiers (pg. 105, last paragraph-pg. 106, first paragraph). Braun teaches applying Dempster-Shafer theory of evidence for fusing multiple classifiers (pg. 99, last paragraph).

8. Claims 56 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhu et al. (US 2004/00140127) in view of Glezer et al. (US 2004/0189311).

Zhu et al., as applied to claim 1, teach a method for identifying the presence of a pathogenic agent of a virus, but fail to teach the pathogenic agent being a toxin.

Glezer et al. teach using arrays for detection of a pathogenic agent being a toxin or virus (par. 0296), in order to provide panels for an immunoassay.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the method of Zhu et al., employing a microarray for detection of a toxin as taught by Glezer et al., in order to detect potential bioterrorism agents.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Yu whose telephone number is (571) 272-2933. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Melanie Yu
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7/9/05